

## REMARKS

The present application has been carefully studied and amended in view of the outstanding Office Action dated August 4, 2003, and reconsideration of that Action is requested in view of the following comments.

The specification has been amended to specifically identify the underlying provisional application and to claim benefit thereof in the specification. As originally filed, the Declaration/Power of Attorney included this information, but the specification did not. However, the oversight has now been corrected.

Claims 1-15 are presently pending in this application. Claims 3-5 have been withdrawn pursuant to a restriction requirement which has now been made final. Remaining claims 1, 2 and 6-15 stand rejected.

By way of explanation, applicant draws a distinction between the layers of carbon that form graphitic sheets within the structure, as opposed to the helter-skelter assembly of these sheets that create the pores and crevices within the overall carbon mass. Applicant is not claiming any kind of impregnation that ends with the metal and nitrogen merely occupying pores, channel ways, or crevices between or amongst the jumbled system of carbon layers, or with the metal or nitrogen merely resting upon the surface of the carbon sheets without being dragged into the graphitic layer so as to become an integral coplanar part of that layer. Applicant specifically states that the metal and nitrogen be incorporated within graphitic sheets of the catalytically active carbon.

Applicant respectfully submits that claims 1, 2 and 6-15 define patentable subject matter which is not disclosed or suggested by the prior art for the reasons discussed

below.

As recited in the claims, the incorporation of the heavy metal is within individual graphitic sheets of the catalytically active carbon. Unlike the present invention, the relied upon prior art utilizes low temperature for impregnation which merely succeeds in parking the heavy metal between the layers rather than imbedded within and coplanar with these individual layers. In the present invention, this result is achieved by a choice of precursor reagents and temperature treatment ranges. The present invention relies upon thermal treatment to effect the incorporation of the heavy metal which is in distinct contrast to the ionization radiation (gamma radiation) disclosed by Berg et al US 3,890,245 ("Berg").

Berg increases the capacity of carbon for gas masks, and does not purport to understand the reasons for the observed benefits when the irradiation was carried out in the presence of a nitrogen atmosphere. As noted by Berg at page 2, lines 63-66, "For reasons unknown, nitrogen seems to be required for achieving increased chemisorption by irradiation of carbon". The capacity achieved by the treatment of Berg is very small, never as much as 100%, and the metals content is enormously high. Unlike the present invention, Berg concerns chemisorption of targeted gases, not catalytic destruction or oxidation thereof. Catalytic destruction increases "capacities" of carbon for removal of vulnerable substrates many thousand-fold.

Berg has no understanding of why irradiation under nitrogen is better than without. As noted above, Berg is only concerned with the "sorption capacity", and does claim "chemisorption", rather than a catalytic conversion (oxidation) process which may have capacities orders of magnitude greater than mere physisorption or chemisorption of

unoxidized precursor, if the products, unlike the precursors, are not inherently volatile. Berg irradiates carbons that have much higher metal loading levels than the present invention.

Litzinger US 4,266,561 describes low temperature impregnation of alumina not carbon, with zinc salts and polyethyleneimine. As such, the deficiencies of Berg are not remedied by Litzinger.

Keith et al US 3,355,317 ("Keith") reaches a maximum of 500 Celsius, a temperature below which the active sites of the present invention can be created from non-cyclic precursors, and specifically recites that the oxide of the metal is formed. (Keith claim 1, parts 3 and 4). Keith claims the oxide, despite having ammonia present in some of his solutions used to soak the carbons. Applicant does not claim that oxides are the form in which the carbons would be effective. In summary, Keith is totally irrelevant to the carbons of the present invention and the cigarettes made with these carbons.

Walker et al US 6,455,159 ("Walker") is totally irrelevant, describing phosphates as the specific impregnant, to protect from oxidation carbon-carbon composites (structural materials) or graphitic materials (graphite carbon, not activated carbon with graphitic sheets). Walker discloses high temperature impregnation and no nitrogen is present.

Reynolds et al US 3,724,469 ("Reynolds") only addresses metal chelates adsorbed or supported on the surface of the carbon, again, at temperatures that cannot embed the nitrogen and metals into the graphitic sheets. Reynolds is strictly a low temperature impregnation with chelates that could not possibly park a metal within individual graphitic sheets at the temperatures used.

The Rideal (1926) publication deals with nitrogen and iron incorporation and does not address other metals such as manganese, vanadium, cobalt, copper, and does not suggest cigarette uses of such carbons., or of carbons containing iron and nitrogen. Rideal is modeling "Blutkohle" ("Blood carbon") made by carbonizing slaughterhouse blood, and the active sites in "Blutkohle" are derived from the heme in the hemoglobin in the blood. Rideal may have succeeded in making active sites from acyclic precursors, but only with iron and nitrogen, totally unlike the present invention.

Accordingly, for the reasons discussed above, it is abundantly clear that the present application is in condition for allowance and notice to that effect is respectfully requested.

Respectfully submitted,

CONNOLLY BOVE LODGE & HUTZ LLP

By   
Richard M. Beck  
Reg. No. 22,580  
Tel. (302) 658-9141

RMB/alh/297630